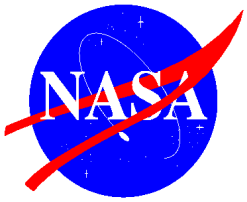

George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

ED27-EMA-FOP-010
Revision B
August 28, 2001

FACILITY OPERATING PROCEDURE

ED27 / MODAL AND CONTROL DYNAMICS TEAM

VERIFICATION OF DATA ACQUISITION SYSTEM USED IN MODAL TEST LAB

CHECK THE MASTER LIST—
VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

DOCUMENT HISTORY LOG

Status (Baseline/ Revision/ Canceled)	Document Revision	Effective Date	Description
Baseline		7/28/99	Document converted from ED73-EMA-FOP-010 Revision B due to reorganization. Previous history retained in system as part of canceled Group files. Revised entire document to reflect the new organizational structure and document numbering system.
Revision	A	8/8/00	Update to include new DIFA Scadas III
Revision	B	8/28/01	Update to include HP VXI

1. INTRODUCTION

1.1 Scope This procedure defines the system used to verify the data acquisition systems used in the performance of experimental modal analysis and testing.

1.2 Purpose This procedure defines the system to fulfill the requirements of ED27-OWI-M&V-002 “Quality Records Control”.

1.3 Applicability This procedure applies the data acquisition systems used in the performance of experimental modal analysis and testing within the Modal and Control Dynamics Team/ED27.

1.4 Frequency This procedure shall be performed on all Data Acquisition Systems (Section 3.1) at one (1) year intervals.

2. REFERENCE DOCUMENTS

ED27-OWI-M&V-002	Quality Records Control
ED27-EMA-FOP-008	Cabling Schematics for the HP9000 Computers with HP3565 Measurement Hardware for Modal Surveys.
ED27-EMA-FOP-014	Cabling Schematics for the HP9000 Computers with DIFA Scadas III Measurement Hardware for Modal Surveys.
ED27-EMA-FOP-015	Cabling Schematics for the NT Workstation Computer with HP E1421B VXI Measurement Hardware for Modal Surveys.

3. DEFINITIONS

3.1 Data Acquisition System The test equipment known as the “Data Acquisition System” is composed of the following components.

3.1.1 Signal Conditioners Consists of one or more instruments which provide a power source to the transducer and provide amplification of the output signal.

3.1.2 Measurement Hardware Consists of one or more modules which provide analog-to-digital conversion of the transducer output signal and sends the digital data to the host computer.

3.1.3 Host Computer Provides a control interface to the measurement hardware and allows for manipulation and data storage of the acquired data.

3.2 Auxiliary Equipment Describes any other equipment used in the verification process that is not part of the Data Acquisition System and includes the following components.

3.2.1 Hand-Held Calibration Exciter w/Reference Accelerometer Provides a constant amplitude and frequency signal as input to the Data Acquisition System. The Hand-Held Calibration Exciter is considered to be Category I test equipment (Mandatory Calibration and Recall) and its calibration is documented as such. The Reference Accelerometer is a Category II item.

3.2.2 Cabling and Patch Panel Provides an interface between the Reference Accelerometer and the Signal Conditioner. Both of these items are Category III items (Not Calibrated).

3.2.3 Digital Multimeter Measures both the amplitude and frequency of the reference signal. The multimeter is considered to be Category I test equipment (Mandatory Calibration and Recall) and its calibration is documented as such.

4. INSTRUCTIONS

4.1 Preparation Set up and cable the Data Acquisition System as described in the applicable reference document.

4.2 Verification Procedure This procedure describes the method used to verify the data acquisition system.

4.2.1 Cable the Reference Accelerometer or reference signal to the first channel of the Data Acquisition System.

4.2.2 Initiate the data acquisition process from the host computer.

4.2.2.1 From the FMON/MIMO select Channels…,Identification… and set the channel dimension to “Voltage”.
4.2.2.2 Then select Channels…,Calibration…, Absolute.
4.2.2.3 Enter the expected output frequency from the hand-held calibrator or reference signal in the “Reference” field.
4.2.2.4 Type the expected voltage output by the reference accelerometer or reference signal in the “Amplitude” field.
4.2.2.5 Set the Reference Value Type to “RMS”.
4.2.2.6 Choose the Autorange and Calibrate option.
4.2.2.7 Select desired channel (by “rubber banding”) and hit the “Start” button.
4.2.2.8 After the calibration cycle is complete, read the value in the “Calibration” field and transfer to quality record.

4.2.3 Repeat for all channels of the Data Acquisition System.

4.2.4 If the percent variance for frequency exceeds %2.0 or the percent variance for amplitude exceeds 4.0% for a given channel, the input module containing that channel will be taken out of service and repaired.

5. QUALITY RECORDS

5.1 Calibration Log Book The following information will be recorded in the calibration log book as an electronic database per ED27-OWI-M&V-002: Model number and NASA property number of the digital multimeter, date this procedure was performed, the measured amplitude and frequency of each channel as recorded in section 4.2.2 above, and the percent variance for both the recorded frequency and amplitude.

Table A: Sample Calibration Record

Ch #	Amp (g's)	Amp % var.	Freq (Hz)	Freq % var.	Date
1	0.997	0.2%	79.625	0.15%	3/6/98
2	0.996	0.3%	79.625	0.15%	3/6/98
…	…	…	…	…	…
16	0.993	0.6%	79.625	0.15%	3/6/98

Keithley 2000 M628880 due: 8/27/00